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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/961,165	09/21/2001	Luis Trejo	TI-21129	4601
7590	05/28/2004		EXAMINER NGUYEN, DONGHAI D	
Godwin Gruber Renaissance Tower 1201 Elm St.- Ste. 1700 Dallas, TX 75270-2084			ART UNIT 3729	PAPER NUMBER

DATE MAILED: 05/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/961,165

Applicant(s)

TREJO, LUIS

07

Examiner

Donghai D. Nguyen

Art Unit

3729

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-11, 13-15 and 17-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-11, 13-15 and 17-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 14, 2004 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 13-15 and 17-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "the last pulse" (claim 15, line 2) lacks antecedent basis.

The phrase "said plurality" (claims 14 and 15) is vague and indefinite. It is unclear as to the plurality of what is referred to.

Furthermore, independent claims 13 and 17 are incomplete since there is no product, i.e. a ball, at the end of a wire found as a result of performing the recited method step(s). Moreover it is unclear how the ball is formed by merely exposing the end of the wire to the current pulses and how the pulse is applied to the wire (by using EFO, arc discharge, etc.).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2-11 are rejected under 35 U.S.C. 103(a) as obvious over Kurt et al in view of Ogasawara et al.

Regarding claims 7 and 8, Kurtz et al disclose a method for forming a substantially spherical free air ball on a fine non-oxidizable wire, comprising the steps of: positioning a free end of said wire (11) opposite to an EFO electrode (28), spaced apart by a gap (Figs. 4A, 4B and 5); applying a train of EFO current pulses between said electrode and said wire (col. 6, lines 63-67); controlling said pulse heights to melt a pre-determined volume of said wire (col. 3, lines 41-47); controlling said pulse widths to create a substantially spherical ball shape (col. 3, lines 41-47); and automatically calculating the train of consecutive EFO current pulses of various heights and widths (first and second pulse train in Col. 3, lines 55-62; Fig. 8), to produce a desired ball characteristics in a predetermined amount of time (Abstract, line 5-14, since the pulse train and energy is control and measured therefor they are calculated to form a desired ball bonding).

Except that Kurtz et al does not specifically disclose the train of EFO current pulses provides a continuous series of pulses of progressively lower heights, yet various pulse widths for minimizing the heat affected zone of the wire (col. 3, lines 41-47; Fig. 8).

However, Ogasawara et al teach continuous series of pulses (current, Fig. 3) of progressively lower heights (Amplitude I_{SP} , I_{AP} , I_{AB} , etc.), yet various pulse widths (duration a-c,

Art Unit: 3729

d-e, f, etc.) for reducing splattering of the wire ball (Col. 2, lines 37-40). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Kurtz et al current pulse having continuous series of pulses of progressively lower heights, yet various pulse widths as taught by Ogasawara et al for reducing splattering of the wire ball.

Regard claim 2, Kurtz et al. disclose the train of pulses comprises only two or three pulses (first and second pulse train in Col. 3, lines 55-62; Fig. 8).

Regarding claim 3, Kurtz et al disclose the wire is selected from a group consisting of gold, copper, silver, alloys thereof, plated materials, and insulated metal wires (col. 5, line 19).

Regard to claims 9 and 10, Kurtz et al show the train of EFO current pulses provides a series of pulses alternating between high and low heights and various widths and the low pulse height is configured to prevent overheating of the free air ball and wire necking while maintaining the EFO arc (col. 10, line 36-48; Fig. 8).

Regarding claim 11, an automatic pulse train calculation is provided by pre-determined empirical data stored in a computerized bonder (40, inherence).

Regarding claim 12, Kurtz et al disclose a method of forming a ball at an end of wire (11), comprising the step of: exposing the end of the wire to a plurality of current pulses (TP, H.V.), wherein each pulse in the plurality has a lower magnitude the preceding pulse (Fig. 8).

Allowable Subject Matter

6. Claims 13 and 17 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

Art Unit: 3729

7. Claims 14-15 and 18-19 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

8. Applicant's arguments with respect to claims 2-11 have been considered but are moot in view of the new ground(s) of rejection.

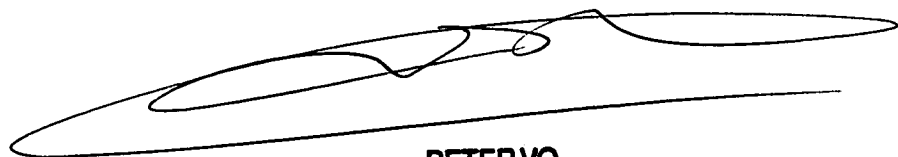
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghai D. Nguyen whose telephone number is (703) 305-7859. The examiner can normally be reached on Monday-Friday (9:00-6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter D. Vo can be reached on (703) 308-1789. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DN

A handwritten signature in black ink, appearing to read 'PETER VO', is written over a horizontal line.

**PETER VO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700**